

4.0 FREE-PHASE PRODUCT RECOVERY

Residual petroleum product (principally gasoline) is present in monitoring well MW-3, located on the south property boundary of the Site (Figure 2). Limited passive recovery has been ongoing, using downhole absorbent. The Cleanup Action Plan requires an initial purging of well MW-3, ongoing monitoring, free-phase product removal, and appropriate treatment and/or disposal.

4.1 OPTIONS AND SELECTION

Potential options for free-phase product recovery range from the current passive system to multiphase extraction (bioslurping) systems. The following summarizes alternatives and selection process:

ALTERNATIVE	PROS	CONS
1. Passive system using downhole absorbent	Uses existing MW-3, simple, inexpensive, low maintenance.	Limited area of influence, No treatment of soils.
2. Downhole skimmer	Uses existing MW-3, extended vertical influence, limited construction, and effective product recovery.	Limited area of influence laterally, product recovery only (no opportunity for treatment of soils)
3. Pumping to OWS for treatment and gravity discharge of effluent.	Uses existing MW-3, extended vertical and lateral influence, higher level of effluent treatment.	Higher equipment costs than Alternatives 1 and 2, More complex operations and maintenance, no vapor extraction.
4. Multiphase extraction, OWS treatment, gravity discharge of effluent.	Uses existing MW-3, extended vertical and lateral influence, higher level of recovery and treatment of both phases than Alternative 3, vapor extraction.	Highest equipment costs, most complex operations and maintenance.

Although the final design of the free-phase product recovery system will be based upon initial pumping of well MW-3 (to assess sustainable pumping rates, pumping impacts on free-phase product recovery, zone of influence, and sizing of the treatment system), the components selected for implementation include:

- Pumping system
- Effluent treatment vault
- Effluent discharge system

4.3 SYSTEM DESIGN AND CONSTRUCTION

The free-phase product recovery system consists of the following components, described in detail in the following, and shown in plan view (Figure 3) and cross-sectional schematic details (Figure 4). All construction and monitoring activities will follow the *Health and Safety Plan* requirements for the Site, provided in Appendix C.

A pump will be installed in well MW-3 (2-inch diameter) with a water level switch to maintain sufficient submergence. Water and free-phase product will be pumped to a 3-chamber treatment vault for product recovery and water treatment:

- Chamber 1: baffle for sediment control and utilizes absorbent or a skimmer to recover free-phase product (gasoline).
- Chamber 2: primary treatment of groundwater using absorbent, aeration, and nutrient injection (if needed).
- Chamber 3: secondary treatment of groundwater using filters media (specific for MTBE removal).

Treated groundwater will be gravity discharged into a drainage gallery and laterals immediately downgradient of the treatment vault. A monitoring port will also be installed in the drainage gallery. Any electrical equipment used in the system will be intrinsically safe from potential fire/explosion, and the treatment vault will be vented (with air filtration) to treat vapors.

Excavated soils will be screened for contamination using visual observation and PID (photoionization detector) measurements. Contaminated soil will be temporarily stockpiled on visqueen and covered prior to transporting offsite to an appropriate disposal facility. Clean onsite soils will be segregated from contaminated soils and used for backfill onsite. Additional clean soil for backfill will be imported from an approved source.

4.4 SYSTEM OPERATIONS and MAINTENANCE

The pumping system will be operated at a rate to optimize product recovery and groundwater treatment and instrumented in a manner to minimize maintenance and operational oversight. The following components will be monitored at system startup and as required during operations:

- Pumping rate and duration
- Water level in MW-3
- Product thickness and recovery volume
- Benzene emissions from the vault (air filter performance)
- Dissolved oxygen, redox potential, pH, temperature, and specific conductance in vault chambers (field measurements)
- Laboratory analyses of effluent for BTEX and MTBE (system performance monitoring)